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NOTES ON THE CONRAD COLLECTION OF VICKSBURG FOSSILS,
WITH DESCRIPTIONS OF NEW SPECIES.

BY THOMAS L. CASEY.

The following paper anticipates a more elaborate descriptive catalogue of the Vicksburg fossils which the author has in view, and it is intended that the species here described as new shall be figured with the others when that is published. It will be sufficient to state that nearly all the species here named for the first time are well known, and represented in every collection from Vicksburg, Red Bluff or Jackson, that can be considered in any way complete, and there can be but little doubt of their ready identification from the diagnoses, comparative or otherwise, which it is thought are drawn up with sufficient fullness and accuracy for that purpose.

PELECYPODA.

Corbula laqueata n. sp.

C. filosa Con. (Am. Jour. Conch., I, p. 145; nomen præoc.).

Differs from the species named *perdubia* by De Gregorio; at least on comparing Vicksburg specimens with those from Red Bluff, I find that the latter form is shorter and differs greatly in sculpture in the umbonal region. The true rugæ do not begin for a considerable distance from the beak in the Red Bluff form, this region being smooth or feebly wrinkled, whereas in the Vicksburg species the rugæ begin very near the beaks, and the latter are more strongly gyrate. As the Vicksburg species is distinct I would propose the name given to it in manuscript by Conrad. *C. laqueata* is a small species, never materially exceeding 6 mm. in length by 5 in height, the posterior flattened surface feebly delimited, the bounding line being rounded and not carinate; the rugæ are comparatively coarse ventrally. It is confined to the upper marl and represented in the lower limestone by a variety having much finer rugæ.

The type of *Corbula interstriata* appears to be the only known representative of the species, and I have never been able to discover it at Vicksburg. I did not examine the hinge with much care, but the general appearance of the species is not very unlike that of *C. gibbosa*

of Lea, being shorter and relatively higher, and it is probably a true *Corbula*.

Under his description of *Corbula aliformis* (*Am. Journ. Conc.*, II, p. 76), Conrad remarks that "this shell belongs exclusively to the Shell Bluff group and is very distinct from *C. alta* of the Vicksburg group." This statement is difficult to comprehend as *C. aliformis* has been found in abundance by Mr. C. W. Johnson in the bluff bordering Mint Spring Bayou, at Vicksburg, at a point only a few feet removed in elevation or horizontal distance from the pocket of sandy clay in which I have taken the true *C. alta* plentifully. It is presumable, therefore, that both these species existed contemporaneously in the Lower Vicksburg. They are both completely unknown from the Upper Vicksburg marl. There is no reason to suppose that other species of this same subgenus of *Corbula* (*Tiza* De Greg.) may not exist at Vicksburg, and in fact I have a single valve that seems to indicate a third species, much more equilateral than the others.

The small *Maetra* occurring in great abundance in the Lower Vicksburg is a different species from *funerata*, which occurs only in the upper marl. It is probable that the former, which is much more inequilateral, may be the one named *inæquilateralis* by Meyer (*Bull.* 1, *Geol. Surv. Ala.*, p. 82), although the figure is rather poor. It is singular that the corresponding species occurring in the Jackson is the counterpart of *funerata* from the Upper Vicksburg, and differs decidedly from the Lower Vicksburg species.

In the Conrad Catalogue (*Am. Journ. Conc.*, 1865) there are two species which appear to have been originally named *Psammobia mississippiensis*, one under the genus *Gari*, on page 4, the other under the genus *Abra*, on page 5; the references seem to show that they were separately described and figured. The species *Abra mississippiensis* is the only one of which I can find the type. It is broadly oval, but slightly inequilateral and of moderately large size, relatively higher in form than *Abra perovata*, with which it occurs very abundantly in some parts of the Lower Vicksburg. The *Gari mississippiensis* (*l.c.*, p. 4) I cannot place and there appears to be no type in the Conrad collection.

There seems also to be no type of *Tellina perovata* Conrad, and I have not been able to identify this species from the material in my cabinet. In the list referred to, the locality "Claiborne" is attached to this species, but probably in error. The *Abra protexta* of Conrad, of which also no type can be found, is very abundant in the Lower Vicksburg, to which it is entirely confined; but it is a *Tellina*

near *vicksburgensis*, if I have identified it correctly from the published drawing, the latter being about twice as large as any of my specimens, but agreeing perfectly otherwise.

***Tellina pilsbryi* n. sp.**

There is an undescribed *Tellina* occurring in large numbers in the Lower Vicksburg, to which I take pleasure in giving the above name in honor of Dr. H. A. Pilsbry, of Philadelphia. It is strongly inequilateral, trigonal, with the ventral edge rounded, rather thick in substance, compressed, the anterior and posterior sides broadly rounded, the surface equally declivous and convex toward the edges and not more abruptly declivous along the anterior edge; it is strongly marked with fine, very close-set concentric striæ throughout. The lateral teeth of the left valve are large and strongly developed, those of the right obsolescent. The larger cardinal of the left valve is subbifid. The length of a nearly full-grown valve is 9 mm.; height about 7 mm.; beak about 2 mm. in front of the median line. The lunule is small and slender.

***Lucina vicksburgensis* n. sp.**

Occurs in the Lower Vicksburg in great abundance. This species is subequilateral, suborbicular, rather compressed, the beaks somewhat high and acute, the adjacent anterior sinus small and deep, the lunule small and deep-set and but little more than twice as long as high as a rule. The surface is covered throughout with strong concentric raised lines which are close-set and low, but becoming strongly lamelliform on the anterior and posterior dorsal declivities, the dorsal edge being rendered rough spiculate and uneven thereby. Cardinal tooth of right valve very oblique. Length $7\frac{1}{2}$ mm.; height $7\frac{1}{2}$ mm. It grew somewhat larger than the type above described, but never exceeded this length by more than about 2 mm. It might be considered closely allied to the Jacksonian *Cyclas curtus* of Conrad (*Am. Journ. Conc.*, I, p. 139), as the posterior side is noticeably more truncate than the anterior, were it not for the fact that *curtus* is described as "ventricose," a term which could not possibly be applied to *vicksburgensis*.

***Lucina scopularis* n. sp.**

Red Bluff formation. Approaches *vicksburgensis* very closely, being orbicular and only moderately convex, but it is a little smaller and the concentric lines are finer, relatively less close-set and more lamelliform, becoming still more strongly so on the anterior and posterior dorsal declivities, though relatively less strongly so than on the corresponding parts of *vicksburgensis*. It differs principally

from the latter in the form of the anterostral sinus, which is longer and more transverse in outline, in the form of the lunule, which is larger and very much more elongate, and in the cardinal tooth of the right valve, which is here scarcely at all oblique, being almost perpendicular to the hinge line. In both species the laterals are moderately developed and the ventral edges smooth internally without trace of crenulation. Length of a moderately large specimen 7 mm., height 6.2 mm. The anterior and posterior sides are almost equally and very broadly rounded. This species is very slightly more inflated than *vicksburgensis*. There is a variety which is very abundant in the Jacksonian of Moody's Branch.

In the Conrad collection the only species of *Lucina* that I could discover is the largest form occurring at Vicksburg—moderately convex, very thin in substance, with feeble hinge and nearly smooth surface. The label attached states that this is *Lucina perlevis*. This is, however, the species which was subsequently described under the name *mississippiensis*. There is some confusion here.

Venericardia vicksburgensis n. sp.

The larger *Venericardia* of the Vicksburg differs specifically from the one occurring so abundantly in the Jackson—named *diversidentata* by Meyer—and also *rotunda* of the Claiborne, in having very much fewer radiating ribs, these being only 19–20 in number. It is found only in the lower limestone, and attained a length of 22 mm. or more. It occurs also at Red Bluff.

Cardita aldrichi n. sp.

Lower limestone at Vicksburg occurring in considerable abundance. It is only moderately convex, inequilateral, with about 15 broad, feebly convex, approximate radiating ribs. The longer ribs, behind the middle, are more notably wide and separated throughout their length by scarcely half of their own width. The anterior lateral hinge tooth is distinct. The length of a specimen rather more than half grown is 5.5 mm., the height 4.5 mm.

Arca invidiosa n. sp.

From the Red Bluff formation of Mississippi I have before me specimens of a small *Arca*, probably allied somewhat to the Claibornian *rhomboidella* of Lea. It is subrhomboidal, very inequilateral, moderately inflated, broadly rounded ventrally, the anterior and posterior sides oblique, the former rounded, the latter longer and nearly straight. The beaks are rather broad, moderately elevated above the hinge-line, bisected by a feeble depression which becomes obsolete ventrally.

The hinge-line is straight externally, broadly feebly arcuate internally, the line of teeth more than three-fourths as long as the shell, the lateral teeth becoming longer and strongly oblique. The space between the beaks and the hinge-line is flattened, nearly smooth except some fine, close-set parallel lines of growth, but at the posterior end there are some coarser parallel and feebly oblique lines. The radial ribs are 28 to 31 in number, rather coarse and separated by much less than their own widths, except in the feebly depressed area radiating from the middle of the beaks where they become finer and relatively much more widely separated, and generally with one fine intermediate rib between them in this region toward the ventral margin only; the ribs also become smaller but very close-set posteriorly in the flattened area toward the hinge-line. The surface posteriorly at an angle of about 30 degrees with the hinge-line is convex, becoming rapidly declivous and explanate to the latter. The muscular scars are rather deep. Lines of growth produce feeble transverse and rather widely separated nodules on the ribs generally becoming obsolete posteriorly. The length of a moderately large individual of this species is 11.5 mm., the height 6 mm.

***Arca delicatula* n. sp.**

Occurs in the Lower Vicksburg limestone in great abundance. It may be regarded as a homologue of *invidiosa* and is doubtless one of the smallest known members of the family. It is elongate, very inequilateral, obliquely parallelogramic, moderately inflated, becoming flattened posteriorly toward the hinge-line, the latter long, thin and straight, the teeth small. The space between the hinge-line and the beaks rather low, flat and smooth or nearly so, narrowing very gradually posteriorly. The umbonal impression, with its diminished ribs, is nearly as in *invidiosa* and many other species. The ribs are some 28 in number, relatively moderately coarse, being generally separated by nearly their own widths, flattened. Length of a moderately large valve 6 mm., height 2.6–2.8 mm.

It is somewhat singular that no reference has been made to the very different sculpture of the right and left valves of *Arca lesueurii* Dall (*mississippiensis* Con.). The left valve has the diverging ribs double, the pairs being much more close-set than the single and smaller ribs of the right valve. It results from this that the left valve is much the stronger and more frequently preserved intact.

***Arca vughani* n. sp.**

While mentioning the genus *Arca*, it may be appropriate to allude to a species, quite common in the Lower Claiborne at St. Maurice,

La., and allied somewhat to *rhomboidella* Lea. It attained a length of more than 20 mm., with a height of 12 mm. or more, obliquely rhomboidal, moderately inequilateral, rounded anteriorly and posteriorly and broadly rounded ventrally. It is moderately inflated, the radiating concavity at the middle of the umbones almost obsolete and having merely slightly wider intervals between the ribs, the latter 41-43 in number. The hinge-line is long and straight, the teeth becoming larger and very oblique laterally but well developed throughout, with their sides finely ribbed, giving to each tooth a bipectinate appearance. The area under the beaks is ample and broadly, divaricately striate. This species differs from *rhomboidella* in its much larger size, more numerous ribs, rounded ventral edge and many other characters, and may be named *vaughani*. A fair illustration of it was given by Mr. Vaughan (*Bull. Geol. Surv.*, 142, Pl. III, fig. 8), in whose honor it is named. A modification of the true *rhomboidella*, but still smaller in size, also occurs sparingly at St. Maurice.

SCAPHOPODA.

Dentalium strenuum n. sp.

In the Upper Vicksburg there are two large species of *Dentalium*; one—*D. mississippiense* of Conrad—is moderately large, gradually tapering throughout its length, feebly, evenly arcuate, having about 12 well-marked raised threads which become doubled or sometimes quadrupled in number anteriorly, but generally almost effaced at the mouth. A moderately large specimen measures 47 mm. in length by 4.6 mm. in maximum diameter. The other species, which may be named *strenuum*, is much larger, nearly straight, but becoming more rapidly arcuate and also more distinctly tapering in form near the posterior end. The ribs are some ten in number at the smaller end, becoming generally quadrupled in number at the mouth, where they still remain very distinct. The substance of the shell is much thicker, being frequently 1.2 mm. through the walls near the middle. The notch at the smaller end is nearly as in *mississippiense*, but generally deeper and more acute. The largest entire specimen in my cabinet measures 67 mm. in length by 6.3 mm. in maximum diameter, but I have seen fragments measuring more than 7 mm. in diameter and which represented examples probably not much less than 90 mm. in length.

Dentalium opaculum n. sp.

Occurs in the Lower Vicksburg in very great numbers. It is smaller than *mississippiense*, somewhat less arcuate, gradually tapering, notably uneven in growth and frequently more or less contorted at

various points in its extent, smooth but dull in luster, devoid of any trace of elevated ribs or threads except toward the smaller end, where some 12 to 16 faintly raised subequal lines become visible. The posterior notch is very feeble and broadly angulate, much feebler than in either of the preceding species. A moderately large example measures 40 mm. in length by 4 mm. in diameter, but the latter dimension occasionally attains 4.5 mm., which would represent a rather large individual.

Dentalium zephyrinum n. sp.

The commonest species at Red Bluff, closely resembling the preceding in general size, form and slight irregularity of growth, but the longitudinal threads are distinct throughout the length and of a different form, being wider and flat, equal, about 16 in number, very strong posteriorly, becoming finer and feebler anteriorly where one or two feebler intermediate threads become visible. The posterior notch is well marked, not broadly angulate but generally rather deeper than wide. The length of the largest individual before me is 41 mm., with a maximum diameter of 4.2 mm.

Dentalium polygonum n. sp.

This species also, from Red Bluff, is still more slender, and is peculiar in being a perfect heptagon in cross-section near the smaller end, the angles of the polygon being minutely elevated, forming fine but conspicuous longitudinal threads, which remain distinct to the larger end; the intervals soon acquire two to four finer threads which never become as conspicuous as the primary ribs. The notch is not present on the truncated apex of the only specimen before me. Length 33 mm., width 3.2 mm.

GASTROPODA.

The *Fusus mississippiensis* of Conrad is a *Latirus* allied to *protractus*, having the columellar folds evident though rather feeble. It differs in the entirely rounded outline of the whorls, there being no wide double band or collar below the suture as in that species. It is moderately abundant in the upper marls.

Fusus vicksburgensis is very rare and also occurs solely in the upper marls. My specimens are all fragmentary, partially decorticated and decomposed. Its broad flat lyræ easily distinguish it and the nucleus and nepionic whorls are also peculiar.

The Vicksburg type of *Clavella* differs from that of the Eocene horizons in having a small conoidal nucleus. They are probably generically different. As far as I have been able to discover there are

at least two species in the Vicksburg, both confined to the lower horizon.

There are several species of *Pleurotoma* in the Vicksburg and sub-adjacent horizons allied more or less closely to *servata* Con., and apparently neglected or overlooked hitherto in our literature, but which can be distinguished readily by brief comparative descriptions. In *servata* the nucleus is smooth, elevated, acute and of 3 or 4 whorls, the last whorl gradually acquiring a few riblets which become by degrees the 7 or 8 large rounded ribs of the body whorls. There is no appearance of a subcentral revolving carina on the whorl adjoining the nucleus, and on each of the more recent whorls there are generally 3 coarse revolving lines thickened on the ribs, with numerous very fine close-set intermediate threads, all occupying about lower half of the whorl. Just below the suture there is a conspicuous thickened collar, immediately below which there is a deep revolving concavity, the surface thence expanding to the uppermost of the coarse revolving lines, the entire surface between the latter and the collar having fine subequal and rather close-set lines. The aperture and canal together constitute about three-sevenths of the total length of the shell.

***Pleurotoma vicksburgensis* n. sp.**

This species occurs plentifully in the Vicksburgian beds, accompanying *servata* and generally confounded with it. It usually attained a little larger size and stouter form, and may be distinguished at once by the fact that the whorl immediately adjoining the nucleus has a strong revolving line below the middle, thickened on the ribs and accompanied by a close-set smaller revolving line immediately above it. The larger whorls generally acquire two other coarse, though much smaller revolving lines, one above and one below the two mentioned, and also finer intermediate threads. Just below the suture the elevated collar is not quite so prominent as in *servata*, and, instead of the abrupt concavity adjoining, the surface is almost evenly concave and rapidly expanded to the system of coarse revolving lines referred to, this surface being also finely, evenly lyrate. The nucleus is much shorter than in *servata*, consisting of between two and three whorls, and is not higher than wide. The aperture and canal are nearly as in *servata*. One of the larger specimens before me measures 27 mm. in length by 7 mm. in width. The double carina of the nepionic whorls remains throughout the most conspicuous feature of the revolving sculpture, the lines becoming gradually more nearly equal and more widely spaced, with the dilatations on the ribs much more pronounced than in *servata*; the ribs, also, are much more broadly

rounded than in that species and become obsolete in the posterior concave area of the whorls. A specimen in the Conrad collection is marked "*servata* var.?"; it is deprived of the nucleus and adjoining whorls. Both this species and *servata* occur also in the Lower Vicksburg, but in slightly modified forms.

***Pleurotoma oblivia* n. sp.**

This is a Red Bluff species somewhat allied to *servata*. It resembles *servata* in general form and conformation of the nucleus, nepionic whorls, aperture and canal, the elevated smooth nucleus of three or four whorls and nepionic spire whorls being formed in the same way, but the ribs are narrower, more strongly rounded, much more elevated and only about six in number, strongly marked throughout the length of the whorl and only becoming extinct at the rather fine sinuous collar just below the suture. The revolving sculpture consists of eight or nine coarse lyræ, more dilated on the ribs, the first three less coarse and subequal, those in anterior two-thirds of the whorl generally with one fine thread intermediate. Length 22 mm., width 6.5 mm. It may be readily distinguished from *servata* by the fewer, narrower and more elevated ribs, more equal revolving lines throughout the length of the whorls and absence of any defined posterior flattened or concave area on the latter.

***Pleurotoma evanescens* n. sp.**

In the Jacksonian of the Kimbrel Beds, outcropping on the Red River a few miles below Montgomery, occurs another *Pleurotoma*, rather closely resembling *servata* in general form, but widely distinct in sculpture and even more elongate in form. The nucleus is smooth, rather higher than wide and has about three whorls, the subsequent whorls mutually subsimilar, each having scarcely six large, though feebly elevated, oblique ribs. The collar below the suture is moderately wide but obtuse and low, not sinuous, and, immediately below it, the surface is feebly concave and moderately rapidly expanded to the middle, where each whorl is obtusely tumid and prominent, the surface thence gradually declivous anteriorly to the suture. The low feeble oblique ribs become wholly extinct in the concavity, occupying almost posterior half of each whorl. The sculpture is very fine and feeble, consisting of relatively broad but very feebly elevated, flat, revolving lyræ, which are very close-set and subequal, mutually separated by a single very fine thread of similar character. The entire sculpture is so feeble that it is very apt to be entirely effaced by water wearing. Length of the largest of the three specimens

before me 32 mm., width 8 mm. On the part of the larger body whorls below the shoulder, the revolving lyræ become more widely separated, with three fine threads intermediate, as a rule, but the lyræ are always flattened and in more or less low relief.

***Pleurotoma hilgardi* n. sp.**

From the Jacksonian of Moody's Branch, I have two species which appear to have been confounded with *servata*, though differing radically therefrom in the structure of the nucleus. One, named as above, is almost similar to *servata* in size, form and in the number and form of the slightly oblique rounded ribs, but has the raised revolving lines some eleven or twelve in number, subequal in size among themselves and becoming only slightly larger on the anterior parts of the whorl. The nucleus differs very radically from that of *servata* or *oblivia*, being small, obtuse and composed of only one and a half to two whorls. The canal also is decidedly shorter. Length 16 mm., width 5 mm.

***Pleurotoma collaris* n. sp.**

This is the second species from Moody's Branch referred to under the preceding description. It is stouter, with a still shorter canal, the aperture and canal together constituting about two-fifths the entire length of the shell. The nucleus is small, obtuse and of about two whorls. Body whorls about seven in number, each with some seven or eight obtuse ribs and a wide and strongly elevated conspicuous collar just below the suture, the upper surface of the collar declivous to the suture and having two close-set revolving striæ, the lower part acutely elevated. The surface below the collar is deeply concave, then rapidly expanding to the posterior of the three strong raised lines which occupy about anterior half of the whorl. The concavity is marked with many very fine close-set revolving lines and the spaces between the three large lyræ referred to also have each about three fine lines. Length 17 mm., width 6 mm.

***Pleurotoma amica* n. sp.**

Of the species allied to *rotædens* and *tenella*, there are several forms in the Red Bluff stratum. One of these, named as above, is somewhat stout, sculptured nearly like *rotædens*, excepting that the concave and rapidly expanded surface immediately below the sutural collar scarcely ever acquires more than about two fine threads which occupy its median parts, while in *rotædens* there are numerous fine threads at this part of the larger whorls. The nucleus in *amica* is larger than in *rotædens*, and there are generally about three of its whorls covered with fine acutely raised riblets, instead of about two whorls, as

in *rotædens*. The strongly elevated median revolving keel is similar to that of *rotædens*, and double, but the nodules are coarser. Length 14.5 mm., width 4.5 mm. The corresponding dimensions of an equally well-grown specimen (that is, of six body whorls) of *rotædens*, from the Upper Vicksburg, are 11 by 2.8 mm. *Amica* may be regarded as a probable ancestor of *rotædens*.

***Pleurotoma ancilla* n. sp.**

The archetype of *tenella* in the Red Bluff may be thus named. It is nearly similar in form to *tenella* but smaller, the nucleus large and well developed, of nearly five whorls, approximately the last two having numerous fine acute riblets; it is higher than wide and acute. The subsequent whorls have a broadly obtuse revolving prominence just below the middle, which is closely ribbed, the ribs longitudinal and rounded; collar below the suture consisting of two approximate subequal and slightly uneven revolving lyræ; space between the collar and median ribbed tumidity moderately expanding and having three or four fine subequal lines; just below the median tumidity there is a fine irregular line. Aperture and canal together short, scarcely more than a third the length of the shell. Length 13 mm., width 4 mm. The specimens measured has about six body whorls.

***Pleurotoma plutonica* n. sp.**

Not rare in the Lower Vicksburg limestones. This species is rather slender, perfectly smooth and polished throughout, with scarcely a trace of revolving sculpture except on the beak, where there are some oblique widely spaced striæ. The nucleus is smooth, acutely ogival, higher than wide and of about four whorls. The subsequent whorls have each about eight low rounded oblique ribs, which become obsolete in a revolving concavity below the suture. The first three, or thereabouts, of the body whorls have a rather pronounced, though obtusely rounded, swelling adjoining the suture beneath, but this is gradually lost on the larger whorls, these having but feeble traces of a raised band at the suture, the latter being a very fine, slightly sinuose and feebly impressed line. The canal is well differentiated from the aperture, and the two combined constitute about three-sevenths of the total length of the shell. Length 12 mm., width 3.7 mm. Another specimen, represented by the spire alone, indicates that the species may attain a length of fully 15 mm. or more. There is no trace of this species in the upper marls.

***Pleurotoma intacta* n. sp.**

Another species, equally well defined, may be named as above. It is small, moderately stout, fusiform, the aperture and canal, which

are not very strongly differentiated, together constituting nearly half the entire length of the shell. The nucleus is as wide as high, consisting of about three whorls, smooth but gradually acquiring the fine riblets which become the eight or nine rather narrow and subacutely elevated oblique ribs of the subsequent whorls, the latter short, about four in number in the largest specimen before me, the ribs angular in profile from base to apex of the whorl, with point of maximum elevation just below the middle of the length and becoming obsolete just below the pronounced uneven and closely duplex collar margining the suture beneath. Each whorl has six or seven coarse, subequal and closely approximate flattened or slightly convex lyræ, those in lower half slightly coarser than the posterior three, and that at the middle slightly thickened at the summits of the ribs. Length of the largest in an extended series 7 mm., width 2.5 mm. This species occurs only in the upper marls at Vicksburg and is common.

PHANDELLA n. gen.

This genus occurs, in the Upper Vicksburg marls, and appears to have no closely allied living descendant, although related perhaps to *Daphnella*. The shell is minute, and the animal apparently existed the greater part of its life in the nuclear stage, there being no example which I have seen, out of a considerable series collected, possessing more than between one and two body whorls. The nucleus is relatively large though evenly conical, pointed, consisting of from five to six whorls which are exquisitely sculptured in two systems of very minute lines crossing each other at an angle of about 45°, producing an appearance very much like the engine-turning frequently engraved upon a watch.

There are before me three species, distinguishable among themselves by very clearly marked characters, but at the present time I will only briefly outline the most abundant of the three, which may be regarded as the type of the genus.

Phandella nepionica n. sp.

This species has about one and a half body whorls, which are together about twice as long as the nucleus, polished and completely devoid of revolving sculpture, having, however, about ten sharply elevated longitudinal or slightly oblique ribs, which become abruptly declivous posteriorly and obsolescent near the suture. The nucleus has about five whorls; the canal is rather short and there is a fine raised collar margining the suture beneath, which line may also be observed to

mutually separate the larger of the nuclear whorls. Length 2.25 mm., width 1.2 mm. Many specimens.

***Drillia harmonica* n. sp.**

A well-defined new species, quite rare in the Lower Vicksburg, and not yet found in the upper marls. It is rather stout, the spire apparently narrowing somewhat more rapidly toward apex. Nucleus simple and composed of three or four whorls. The subsequent whorls are rather short, each with some eight or nine strongly marked rounded ribs, longitudinal in direction or nearly so, and generally in line from one whorl to the next; they extend nearly throughout the length of the whorl, becoming obsolete only in the narrow revolving concavity below the ante-sutural elevated collar, which is rather thick and conspicuous and marked posteriorly with one or two striæ. Each whorl has some seven or eight nearly equal revolving lyræ, those near the middle mutually separated as a rule by a finer line. The aperture is rather wide, the canal very short, the two together but little more than a third of the total length, the callus near the posterior angle of the aperture tumid and conspicuous. Length 11 mm., width 3.7 mm. I had confounded this species with *mississippiensis*, of Conrad, until a recent inspection of the type of the latter shows that it is very different; *mississippiensis* is very stout much larger, with the revolving concavity below the sutural collar very wide, constituting about half the entire length of the whorl; the short, broadly rounded ribs are confined to anterior half of the whorls and are obsolete in the posterior concavity. The specimen is somewhat water-worn, so that the sculpture is not distinct, but there are apparently revolving raised lines which distinguish the species at once from the smooth and otherwise very different *eboroides*. The type seems to be unique.

***Scobinella pluriplicata* n. sp.**

In the genus *Scobinella*, of Conrad, it should be stated that the species occurring at Red Bluff is distinct from *cælata* of the Upper Vicksburg marls, and I would propose the above name for it. This species is much larger than *cælata*, with a relatively more elongate and less rapidly acuminate spire, and differs also in sculpture. In *cælata* there is a broad flattened duplex collar extending from the suture anteriorly for about a fifth the length of the whorl, the surface then concave to well below the middle, generally with about three revolving lines at the bottom of the concavity, the middle one of which is nodulose; the surface from the concavity to the lower limit of the

whorl is more prominent, flattened and divided into two coarsely nodose sections by a fine stria. In *pluriplicata* the whorls are relatively much more elongate, and, from the suture for about one-sixth of the length, are flattened; the next sixth of the length is occupied by a small concavity containing a nodulose line, which is even more prominent than the preceding flattened collar; the surface thence to the anterior limit of the whorl, occupying fully two-thirds of the length, is still more elevated but flattened, cylindrical and divided into about four nodose rings by three rather coarse equidistant revolving grooves. The canal is more prolonged and more obconic than in *cælata*, and the plications of the columella number some four to five. Length of a specimen of about seven body whorls 35 mm., width 9.5 mm. Length of a specimen of *cælata* of the same number of whorls 21 mm., width 6.5 mm. *Pluriplicata* occurs also at Byram's Ferry. The Lower Vicksburgian at Vicksburg has not yet yielded a trace of the genus.

***Scobinella famelica* n. sp.**

Very slender and elongate, the aperture narrow, scarcely at all wider than the canal, from which it is but feebly differentiated, both together constituting but little more than a third of the total length of the shell. The nucleus is rather small, of about three whorls, with its summit obtuse. Subsequent whorls each with a prominent double collar subjacent to the suture and a broad obtuse and strongly elevated revolving keel, fully a third as wide as the length of the whorl and divided into two subequal rings by a revolving groove, situated below the middle of the whorl; this duplex ring is obliquely and coarsely nodose. In the concavity between the collar and the elevated keel there are two or three fine revolving lines, the posterior of which is finely and more or less evenly nodulose. The anterior margin is a fine line on a level with the duplex ring and separated therefrom by a narrow deep concavity. Columella with six or seven rather unequal, close-set oblique folds, forming a slightly tumid columellar band as wide as the distance separating it from the posterior angle of the aperture. Length about 25 mm., width 4.5 mm. It occurs exclusively in the Upper Vicksburg marl and is rare.

***Scobinella macer* n. sp.**

Upper Vicksburg. This species resembles the preceding in general form and sculpture, but has only two folds on the columella. These folds are strong, subequal and do not seem to be attended by any adventitious plicæ. This species is elongate and very slender, the nucleus simple and of about three whorls. Each of the subsequent

whorls has a broad, moderately elevated double collar subjacent to the suture and a strongly elevated, obtuse and nodose double carina at a third of the length from the anterior margin, the deeply concave intermediate surface having a single strongly beaded line along the middle and a few other very faint and obscurely irregular revolving threads. The lower margin is moderately elevated, the surface thence to the large double carina concave. The spire before me consists of seven body whorls and is 10 mm. in length and about 3.5 mm. in width at base. The remainder of the shell is missing, it being very rare and represented thus far only by fragments.

The genus *Scobinella*, of Conrad, is probably valid, but contains species having anywhere from two to six or seven columellar folds.¹ They hold together very well in general type of sculpture and depart materially in a great many characters from *Cordieria*. The genus *Cordieria* does not occur in the American Eocene fauna and there is considerable confusion in the literature concerning it. Cossmann states that the first two of the species originally placed in *Cordieria* by Rouault are really *Borsonia*, and, assuming the third species as the type, gives an illustration of a "plesiotype" which would bear considerable resemblance to *Latirus* were it not for the obsolete canal. He also states that the embryo of *Cordieria* is paucispiral with subglobular apex, which does not agree with our species, such as *biconica*, *plicata* and *ludoviciana*, and another genus may have to be made for these. In *Scobinella* the sinus is well developed, but in *Cordieria* and the American analogues named above it is very feeble, so that on this ground as well as many others the association of *Cordieria* and *Scobinella* by Tryon was entirely unjustifiable. In fact the Pleurotomid affinities of some of the forms assigned to *Cordieria* stand in need of fuller confirmation. *Turbinella perezilis*, of Conrad, is a species having two strong columellar folds and is of uncertain relationship. We do not appear to have the true *Borsonia* in the American fauna, and *Borsonia plenta*, of Harris (*Proc. Acad. Nat. Sci. Phila.*, 1895, p. 63), cannot properly be referred to that genus. Besides the species from Red Bluff and Vicksburg, referred above to *Scobinella*, this genus will include *Pl. (Eucheilodon) reticulatoides* Harris (*l.c.*, p. 63), from the Lower Claiborne of Texas. The genus *Eucheilodon*, as represented by *crenocarinarum* of Heilprin, differs from *Scobinella* in the form of the nucleus, this being very large, probably indicating a slightly different line of descent.

¹ If *Pleurotoma (Moniliopsis) elaborata* Con., be included, as I believe to be proper, the genus will have also species without columellar folds as is the case with the genus *Microdrillia* to be described below.

MICRODRILLIA n. gen.

A number of minute Pleurotomids, including *infans* and *cossmanni* of Meyer, and *harrisii* of Aldrich, have been referred to by Cossmann under the names *Asthenotoma* and *Scobinella*, by Harris under *Mangilia*, by Aldrich under *Glyphostoma*, and by Meyer, Vaughan and others under *Pleurotoma* in its broad sense. They are all very small and characterized by a well-developed, multispiral, closely coiled embryo, having one to three of its basal whorls costulate, few body whorls which are wholly devoid of costæ but spirally carinate, the retral sinus relatively large, circularly rounded and close to the suture, the aperture oblique, columella callous, with or without plications, and the canal short or subobsolete.

The genus *Microdrillia* differs from *Asthenotoma*, to which *cossmanni* was referred by Cossmann, in the structure of the embryo, and, especially, in the position of the retral sinus, which in *Asthenotoma* corresponds in its greatest depth with the median line or periphery of the whorls. In fact, there is only one American species known to me which can properly be assigned to *Asthenotoma*, this being the *Pl. texana* of Gabb. *Microdrillia* is much more closely related to *Glyphostoma*, as suggested by Aldrich, but is not at all allied to *Mangilia*. It appears to have become wholly extinct in the Oligocene or Lower Miocene. The species were numerous and individually abundant, especially in the mid-Eocene of the Lower Claiborne, and those before me may be readily identified by the following table:

Columella without folds,	2
Columella with numerous rather widely and evenly spaced folds; shell thick and heavy, the base angulate, not at all rostrate.	8
2—Shell rhomboidal in profile, thick and strong, the ante-peripheral part but little shorter than the entire portion behind the periphery of the body whorl; revolving carinæ very thick.	3
Shell more elongate, the ante-peripheral part always much shorter than the post-peripheral, thinner and more delicate, with relatively fine carinæ.	4
3—Embryo small, evenly and broadly conical, of three smooth and one finely costulate whorls; body whorls four in number, each with three strong carinæ, the lowermost carina first appearing generally on the second or third whorl; lines of growth strongly marked, cancellating the body whorl; columella subumbilicate in the type. Length 4.5 mm.; width 2 mm. Jacksonian Eocene of Moody's Branch, Miss., [<i>Pleurotoma</i>] <i>cossmanni</i> Meyer [<i>meyeri</i> Coss.]	
Embryo similar in structure but much larger; body whorls generally not more than three in number, each with two very thick carinæ; columella not umbilicate in the specimens at hand; lines of growth very fine, scarcely noticeable. Length 2.8 mm., width 1.4 mm. Lower Claiborne Eocene. Vesey Creek, Lee Co., Tex.	<i>solidula</i> , n. sp.

- 4—Peripheral carina at or above the middle of the whorls; concave fasciolar surface simple or with one or two fine simple revolving threads. 5
- Peripheral carina below the middle of the whorls; beak well defined and rapidly acuminate; fasciolar surface with a conspicuously beaded thread; embryo with two or three smooth and about two costulate whorls; body whorls three or four in number. 7
- 5—Base of the shell distinctly rostrate; body whorls about four in number. Form stout, the spire whorls short, about three times as wide as long, with a subduplex subsutural collar and three other single carinæ, the fasciolar surface with two fine revolving threads; beak short and broad; lines of growth strongly marked; embryo well developed as usual, higher than wide, ovulate at tip, with three smooth and two costulate whorls. Length 5.7 mm., width 2.3 mm. Lignitic Eocene. Wood's Bluff horizon. *rostratula*, n. sp.
- Base of the shell angularly acuminate, not at all rostrate; body whorls variable, but never exceeding four as far as known. 6
- 6—Embryo as wide as high, obtusely oval at tip, with three smooth and two costulate whorls; subsequent whorls four in number, each with one subsutural and three other equal carinæ; fasciolar surface without a revolving thread. Length 5.6 mm., width 2.25 mm. Lower Claiborne Eocene. St. Maurice, La. *robustula*, n. sp.
- Embryo acutely conical, scarcely higher than wide, with three smooth and one costulate whorls; subsequent whorls not more than two in number in any of the three type specimens at hand, similar to those of *robustula*, but much more slender. Length 2.3 mm., width 1 mm. Lower Claiborne Eocene. St. Maurice, La. *minutissima*, n. sp.
- Embryo larger and much more complex, evenly conical, as wide as high, with two small smooth whorls and three finely and closely costulate, the latter strongly convex near their basal margins; form rather stout; whorls two in number in specimens at hand, the fasciolar surface without a revolving thread. Length 3.9 mm., width 1.5 mm. Red Bluff Eocene.
- [*Pleurotoma*] *infans* Meyer
- Embryo nearly one-half higher than wide, subcylindrical, rapidly pointed at tip, with three smooth and nearly three coarsely costulate whorls, the latter strongly and more medially convex; subsequent whorls not exceeding four in number, the fasciolar surface with a fine revolving thread; shell much more slender and elongate than in *infans*. Length of embryo alone 1.4 mm., width .8 mm. Upper Vicksburg Oligocene. *vicksburgella*, n. sp.
- 7—Beaded thread below the middle of the fasciolar surface, a finer simple thread between it and the subsutural carinule; granulations of the beaded thread fine but distinct. Length of a specimen of 3.5 body whorls 6.7 mm., width 2.6 mm. Lower Claiborne Eocene. St. Maurice, La.
- [*Pleurotoma*] *lerchi* Vgn
- 8—Spire more rapidly narrowed toward apex, the embryo very small, of three or four whorls, the lowermost apparently costulate; body whorls five to six in number, each with subsutural and submedian coarse equal carinæ and a third, finer and less conspicuous, between the latter and the base; concave fasciolar surface between the coarse carinæ with a fine median revolving thread; lines of growth well marked as usual; columella subumbilicate as a

- rule. Length 6.5 mm., width 2.3 mm. Lower Claiborne Eocene. Moseley's Ferry, Burleson Co., Tex. *aldrichiella*, n. sp.
- Spire evenly, conically acuminate, the body whorls never exceeding four in number; embryo always larger and well developed. 9
- 9—Revolving carinae as in *aldrichiella*, very coarse; fasciolar surface with a more or less distinct revolving thread; embryo as wide as high, conical, acutely pointed, with three smooth and one costulate whorls; shell stout and thick. Length 5 mm., width 2 mm. Lower Claiborne Eocene. Elm Creek, Lee Co., Tex. [*Glyphostoma*] *harrisi* Ald.
- Revolving carinae very much finer; shell narrower and more slender; embryo well developed, higher than wide, acutely conical, with four smooth and one costulate whorls; fasciolar surface without a revolving thread; columella with four or more folds as usual in this group. Length of specimen with three body whorls 4.5 mm., width 1.5 mm. Lower Claiborne Eocene. Elm and Vesey creeks, Lee Co., Tex. *elongatula*, n. sp.
- Revolving carinae fine as in *elongatula*, the shell similarly slender, differing in having two costulate embryonic whorls, a fine revolving thread in the fasciolar surface and but two columellar folds; body whorls but two in number in the type. Length 2.3 mm., width 1 mm. Red Bluff Eocene. *biplicatula*, n. sp.

A species which is strikingly similar to the Lower Claiborne *harrisi* was figured by Cossmann (*Essais Pal. Comp.*, deux. liv., Pl. VI, fig. 35) under the name *Scobinella laeviplicata* Gabb. It is said to have been found at Jackson, Miss., by Meyer, but I have seen no plicate species from that horizon. Cossmann's generic diagnosis of *Scobinella* is also drawn from this figured "plesiotype," and for this reason does not apply to the *Scobinella* of Conrad at all. The true *laeviplicata* is a *Eucheilodon* and is perfectly synonymous with *reticulata* Gabb. The *reticulatoides* of Harris is, however, a true *Scobinella*, the name being therefore somewhat unfortunate as *Scobinella* and *Eucheilodon* are amply distinct genera.

Under the description of *Pleurotoma infans* (*Geol. Surv. Ala.*, Bull. I, p. 75) Meyer refers to a Vicksburg form under the name var. *brevis*. This form is really not described at all and must be considered a list name, it being simply stated that it is decidedly stouter than *infans*. Even this statement, however, will not apply to the *vicksburgella* defined above, which is more slender and elongate than *infans* and differs radically in the form and sculpture of the embryo.

Mr. Harris states (*Bull. Am. Pal.*, Vol. 3, p. 24) that the *Glyphostoma harrisi* of Aldrich is a synonym of *infans* Meyer. This is incorrect, as subsequently held by Mr. Aldrich; the two species are not at all closely related.

COCHLESPIRELLA n. gen.

The *Fusus nanus*, of Lea, belongs to a genus widely different from *Microdrillia*, but allied more closely to *Cochlespira* of Conrad. The genus, which will include also *insignifica* of Heilprin, which is not the same as *nanus* according to some very accurate drawings of the types very kindly lent me by Mr. Aldrich, and one or two undescribed Texan forms, may take the above name.

Conus scopularis n. sp.

In the Red Bluff deposit there is a *Conus*, about the size of the Vicksburgian *alveatus*, but with a much more depressed spire and differing also in sculpture to a marked degree. This species differs also from any of the forms found in the Jacksonian. It is rather broadly obconic in form, the exterior outline of the body whorl straight, becoming very broadly, feebly arcuate toward the shoulder, just below which there are some two or three close-set and very obsolete obliquely rugulose revolving striæ. The anterior oblique revolving striæ are very feeble, subobsolete and occupy lower third of the whorl. The oblique anterior columellar fold is feeble. Spire extremely short and flattened, not more than an eighth or ninth as long as the body whorl, the whorls flat, each with five strong revolving lyre separated by equally large grooves, the arcuate lines of growth very distinct, producing a beaded or scabrous appearance. Length 28 mm., width 16.5 mm. The fine striæ on the face of the body whorl at the top and parallel to the acute shoulder angle distinguish this species at once from any in the adjacent horizons.

The species named *Bursa mississippiensis* by Conrad, in the list of 1865, is, in all probability, the young of *Triton conradianus* Ald., of the Red Bluff horizon. I have found this species in the Lower Vicksburg. *Bursa abbreviata* is, however, a distinct species, moderately abundant in the upper marl at Vicksburg, to which it is confined, as is also *Distorsio crassidens*. *Tritonopsis subalveata*, of Conrad, is confined to the Lower Vicksburgian, like *Bursa mississippiensis*.

Phos macilentus n. sp.

Phos mississippiensis, of Conrad, occurs in both horizons at Vicksburg, but does not occur at Red Bluff. The species of the Red Bluff formation, which has hitherto been confounded with it, may take the name indicated. It is much narrower and more elongate than *mississippiensis*. The ribs are more numerous, finer and not so nodulose at the points where they are crossed by the revolving sculpture. The revolving lines are subequal among themselves, finer than in *mis-*

mississippiensis and not so strongly alternating in size. Length of a specimen of six body whorls 14 mm., width 4 mm. *P. mississippiensis* seldom has more than five body whorls, and an average specimen measures 13.5 mm. by 5 mm.

***Phos falsus* n. sp.**

I have before me a remarkable Red Bluff *Phos*, which may be named *falsus*. It is very much larger than *macilentus*, though nearly as slender. The nucleus is as in that species and *mississippiensis*, consisting of four whorls, the lowest of which is sculptured with very fine obliquely sigmoid riblets. The body whorls are six in number, with rather widely spaced longitudinal ribs, some eight in number, subequal among themselves on the first four whorls, but then becoming very widely spaced and finally completely disappearing, leaving the surface even; the revolving lines are distinct but not very coarse, and are mutually separated on the larger whorls by two or three fine, closely spaced threads. The type before me has a strong rounded varix on the sixth whorl and another forming the outer lip. Length 19 mm., width 6 mm.

***Metula fastidiosa* n. sp.**

In the Red Bluff bed there is an apparently undescribed *Metula* greatly resembling *gracilis* Johnson, from the Lower Claiborne of Texas (*Proc. Acad. Nat. Sci. Phila.*, 1899, p. 75, Pl. II, fig. 3). This species, which may be named as above, has a smaller and more rapidly pointed spire than *gracilis*, and has a greater number of varices. The nucleus is simple, smooth, rather higher than wide, ogivally pointed and of about three whorls, the subsequent whorls five in number, broadly, evenly rounded at the sides in profile, each with a feebly elevated flattened varix, relatively rather wide, on which the longitudinal ribbing becomes obsolete and the revolving lyræ also obsolete except on the body whorl, where they continue uninterruptedly over the varix, which here becomes relatively still wider though so slightly elevated as to be scarcely definable. The ribs are small, and, from varix to varix on the spire whorls, about 32 in number; on these whorls the revolving grooves are about 10 in number, and, with the exception of the two posterior and one finer anterior, do not cross the ribs but appear as short excavated lines between them; on the body whorl, however, all the grooves cross the ribs but are reduced in width on their summits; the ribs on the body whorl are also somewhat changed in character, being notably less steep in cross-section on the side lying in the direction of the growth of the shell. The columella is thickened

anteriorly below the middle and the aperture and canal together are half as long as the shell. Outer lip with a plicate band parallel with the edge at a short distance therefrom. Length 15.5 mm., width about 6 mm.

***Metula fragilis* n. sp.**

This is apparently the direct descendant of *fastidiosa* in the Upper Vicksburg marl and is a much larger species, with more numerous and relatively much finer and more close-set ribs; it is very thin and delicate in substance, very rare and always occurs in a fragmentary condition. From a fragment before me I am able to compute the diameter of the body whorl to be about 10 mm. The longitudinal riblets are at least 90 in number, and the revolving lines on the largest whorl of the spire about 20. No varices can be seen on the fragments before me. The revolving grooves are shallow, those near the base and apex of the whorls broader and more thoroughly obliterating the ribs. The ribs are broadly arcuate longitudinally. The length of the specimen at hand must have been at least 25 mm. The shell walls are composed of three layers, of which the inner, very thin, and the outer, thicker, are solid and amorphous in texture, the two separated by a very thin layer of prismatic structure having the fibres perpendicular to the surface.

***Olivella affluens* n. sp.**

There are two very distinct species of *Olivella* occurring abundantly in the Vicksburg strata. One of these, which may be assumed to be the typical *mississippiensis*, has the nucleus small, of very few whorls and the nucleal sutures obliterated. The whorls of the spire are completely unexcavated along the anterior edge. The other species, named as above, is as common as *mississippiensis*; it is rather smaller, the nucleus being, however, much larger, very obtuse, composed of about three whorls having the sutures all distinct and impressed. Each whorl of the spire has a deep and clearly defined revolving groove at the lower margin, which is entirely wanting in *mississippiensis*. The anterior folds of the columella are less oblique than in that species. Length of a moderately large specimen, having four body whorls beside the nucleus, 14.5 mm., width 5.7 mm. The aperture is somewhat narrow, and is rather less than two-thirds the total length of the shell. The differences between these two species are at least subgeneric.

It would seem to me that *Fulgur spiniger* and *nodulatum*, of Conrad, are distinct species and not mere varieties of one. I have collected a number of specimens of *spiniger*, and there is no marked variability

to be perceived. *Spiniger* is confined to the Upper Vicksburg marl, while *nodulatum* has occurred thus far only in the Lower Vicksburg limestone. The latter differs in both form and sculpture from *spiniger*, but varies of course in the relative amount of shoulder exposed above the suture, as is generally the case throughout the genus. The form occurring at Red Bluff differs from *spiniger* in its larger size, rather more elongated form, feebler sculpture, less strongly differentiated whorls of the spire, and more feebly developed spines of the spire whorls, also in usually having traces of a fine subobsolete, remotely and minutely subnodulose line at some distance below the spinose shoulder line. It may not be more than a subspecies of *spiniger*, but resembles that species more closely than *nodulatum*, from the intermediate beds constituting the Lower Vicksburg, a case very similar to that before referred to under *Maetra*.

***Lyria nestor* n. sub-sp.**

The *Lyria mississippiensis*, of Conrad, moderately abundant in the Upper Vicksburg marl, is represented in the Red Bluff bed by this form which must be regarded as at least subspecifically distinct. It is much more elongate in outline than the Vicksburg species, and is more distinctly sculptured. The longitudinal ribbing is more obtusely rounded and less distinct. The length of a moderately large specimen is about 43 mm., with a maximum width of 18 mm. It is accurately figured by Dall (*Trans. Wag. Inst.*, III, Pl. 6) under the name *Lyria costata* Sowerby, and, in his opinion, both this and the Vicksburg form are varieties of that European species. The Vicksburg and Red Bluff forms are, however, distinctly differentiated in facies and each holds to its own type through very extended series, without exhibiting much variability.

Conrad's type of *Conomitra staminea* is apparently unique as far as the Vicksburg strata are concerned, and, from the matrix that partially envelops it, would appear to have come from the upper marl. It is a small species, about the size of the Claibornean *fusoides* and somewhat of the same form. The revolving grooves are deep and do not cross the ribs, thus forming short and very conspicuous excavated lines, nearly as in *Fusimitra cellulifera* Conrad. The species figured by Dr. Dall (*l.c.*, Pl. 4, fig. 2) is quite evidently distinct from *staminea*, and is a much larger species. It also seems to be distinct from *angulata* Heilp. The specimen figured by Dr. Dall has five body whorls and measures 15 mm. in length. A specimen of the true *staminea*, recently lent me by Mr. Aldrich and found at Byram's Ferry, having

four body whorls, measures only 8.5 mm. in extreme length. I have collected a number of specimens of *M. vicksburgensis* at Vicksburg, and feel sure that this is also distinct from *staminea*, having no suggestion of the peculiar deep coarse revolving sculpture of that species.

The *Mitra mississippiensis* of Conrad is a specimen of *conquisita* in which the revolving liration covers the entire body whorl; it is generally effaced on the upper parts of this whorl in half-grown and older individuals, but occasionally persists until rather late in the growth of the shell. *Millingtoni* is a different species.

The *Capulus* occurring at Vicksburg is apparently different from *americanus* of the Jacksonian, at least subspecifically. It is extremely rare at Vicksburg and has been found thus far only in the upper marl.